FAA GENERAL AVIATION NEWS

JUNE 1976

A FLIGHT STANDARDS SAFETY PUBLICATION FOR AIRMEN

Controller to pilot . . . How do you read?

COVER:
Sunup at Scottsdale

FAA GENERAL AVIATION NEWS

DEPARTMENT OF TRANSPORTATION/FEDERAL AVIATION ADMINISTRATION VOL. 15, NO. 2

CONTENTS/June 1976

3 Nick-Knocked Props

6 Pilot/Controller Glossary

7 Status of FARs

8 Fear of Not Flying

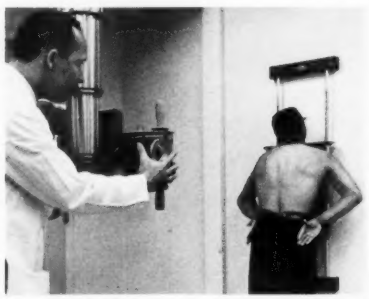
10 Famous Flyers: Hustling Howard Hughes

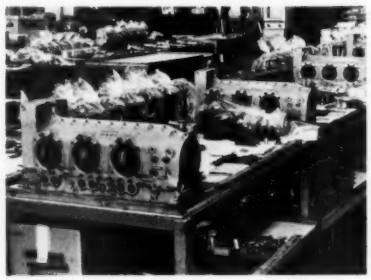
12 Overhauled and Rebuilt Engines

13 Briefs

14 News Log: New Jersey Sergeant Wins Sweepstakes Airplane . . . Missouri FBO is Top General Aviation Mechanic . . . More "Bomb Sniffers" Sought . . . FAA Withdraws Color-Code Rule

15 Flight Forum


Facing up to it Page 8


Getting it together Page 12

William T. Coleman, Jr., *Secretary of Transportation*
Dr. John L. McLucas, *Administrator, FAA*
R. P. Skully, *Director, Flight Standards Service*
Bernard A. Geier, *Chief, General Aviation Division*

David Gelfan, *Editor*
Gernot Rasmussen, *Art Director* Ruth Taksel Benedict, *Assistant Editor,*
Louise Oertly, *Editorial Assistant*

FAA GENERAL AVIATION NEWS is published by Flight Standards Service, Federal Aviation Administration, Department of Transportation, Washington, D.C. 20591, in the interest of flight safety. The magazine is designed to promote safety in the air by calling the attention of general aviation airmen to current technical, regulatory and procedural matters affecting the safe operation of aircraft. The use of funds for printing FAA GENERAL AVIATION NEWS was approved by the Director of the Office of Management and Budget on July 30, 1974. All printed materials contained herein are advisory or informational in nature and should not be construed as having regulatory effect. The FAA does not officially endorse any goods, services, materials or products of manufacturers that may be mentioned.

SUBSCRIPTION SERVICES

FAA GENERAL AVIATION NEWS is sold on subscription at $6.20 per year (individual copies, 55 cents) by the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Use the self-mailer order form in the centerfold of this magazine to subscribe. Prices are subject to change without prior notice.

Please anticipate one to two months for processing orders. Subscriptions are for one year only, and only one renewal notice is sent. Act promptly to avoid lapse of subscription.

Subscription problems. Contact the Service Section, SSOS, GPO, Washington, D.C. 20402.

Change of subscribers address. Send both old and new address to MAIL LIST SECTION, GPO, Washington, D.C. 20402.

Nick-Knocked Props

The metal propeller appears to be one of the most durable parts of the modern light aircraft, and indeed it is, when properly maintained. But as an instrument of thrust it has more pressure exerted against it then any other part of the aircraft. The blades are designed and constructed in such a manner as to withstand maximum power loading, but when the shape of the blade is marred or disturbed, its inherent strength can be reduced to a point where blade failure in flight is possible. Such failure can take place entirely without warning, as it happened recently in the case of a private pilot in southern California.

This 26-year old graduate student, who had a total time of 125 hours in his logbook and was building up time toward a commercial certificate, rented a Cessna 172 at the Orange County Airport in Santa Ana, on the Pacific coast just south of Los Angeles. Accompanied by his young son, he planned to fly down to San Diego and return in the same day, a 200 mile round trip. The rental aircraft, about three years in service, appeared to be in fine shape and no problems were disclosed during the preflight examination. The propeller blades appeared to be smooth and free of nicks.

Takeoff was uneventful and with clear skies on all sides the pilot set up a cruise altitude of 7,500 feet as he followed the coastline south. Half an hour after departure he was approaching Oceanside, about midway to San Diego, when without warning the aircraft began to vibrate severely. The startled pilot had no idea of his problem, but he promptly reduced power, and when the shaking persisted he shut down the engine with mixture control. The windmilling prop up front displayed two distinct arcs—a consequence of one blade having snapped off about eight inches from the tip. It was a frightening discovery, and the pilot had no time to speculate as to why the blade separated. He had to find the nearest landing field.

Fortunately he did not have far to look. He was only a few miles north of Oceanside, and as he set up the aircraft in a normal glide he spotted Oceanside Municipal Airport at the northwest edge of town. A few minutes later he was over the airport with more than 2,000 feet of altitude still left to dissipate, and so he commenced a series of gentle S turns intended to bring him into the pattern at 1,000 above ground level. A miscalculation cost him more altitude loss than he had intended. however, and he found himself a mile out from the threshold at 300 feet—and of course, no power. The lad in the seat beside him looked a little tense.

There was no chance to make the runway now, and the pilot wisely decided to put his aircraft down while he still had control of it. He settled for an open field at his left, overgrown with weeds and brush. Touchdown was level and fairly smooth, but after the *Skyhawk* had rolled several hundred yards over coarse growth it was suddenly confronted with a small ditch, which the pilot could not avoid. The aircraft was flipped over by the impact and substantially damaged, but there was no fire or injuries. Father and son scrambled out of the cabin and dusted each other off.

This small leading-edge nick (arrow) resulted in a broken prop and a shaken-up airplane.

Left—good pre-flight propeller inspection includes looking for grease or oil leaks and feeling for looseness, damage, cracks and nicks. Above—the leading edge is most vulnerable to prop nicks and their effects.

During the subsequent accident investigation, the broken propeller was sent to the Naval Air Station Research Laboratory at North Island, Calif., for metallurgical examination. The findings, along with the engine log, led to a detailed history of the prop failure. On an earlier flight the blade had been struck by some foreign object—probably rocks or gravel—at the leading edge, about eight inches from the tip causing a small indentation. The nick had been filed smooth by a mechanic, but not in the recommended manner. On subsequent flights a fatigue crack had developed at this site, resulting in the blade snapping off in normal use.

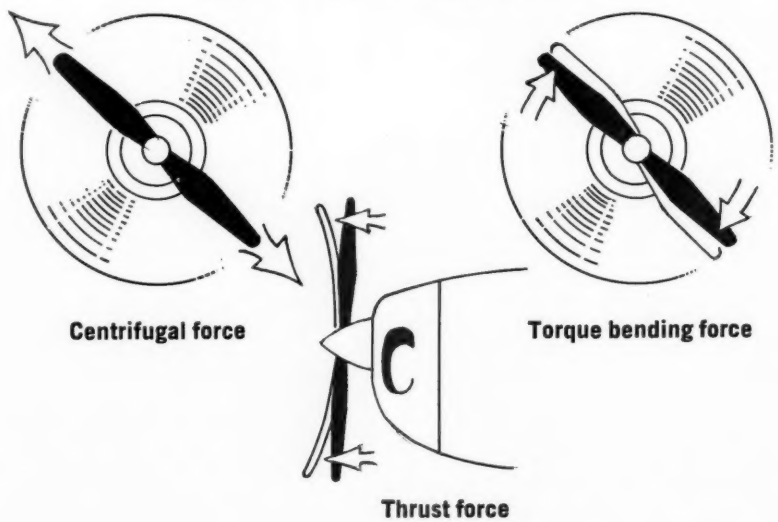
Most pilots find it hard to believe that a small cut or nick in a sturdy metal propeller can lead to a broken prop. To understand how this is possible, it helps to know something about the stress and force to which a propeller in action is subjected.

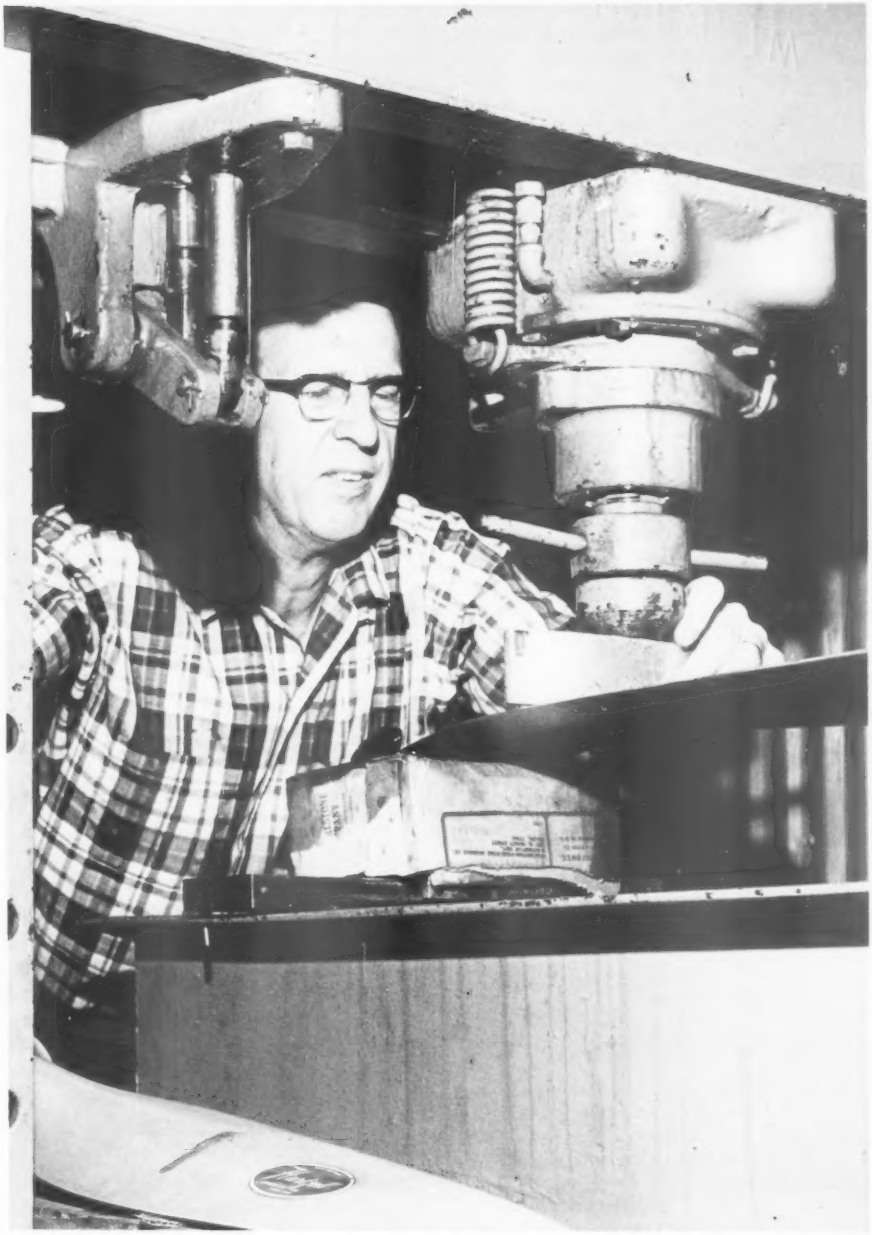
The most obvious force is centrifugal —the rotating action which exerts an outward pull on the blades. If you imagine an enormous giant trying to draw your arm out of your socket, exerting a force some 7,500 times the weight of your arm, you can appreciate the strain on the blade.

The revolving blade is also subject to a centrifugal *twisting force*, which may be visualized as the effect of a gigantic hand attempting to flatten the blade, exerting a force as high as 20,000 lbs. per sq. in. Again, the *thrust* exerted by the propeller results in a forward pull of the blades (straining the engine to pull the plane out of a mudhole can result in an out-of-track prop.) These two kinds of stress produce lines of force running across the face of the blade.

But the kind of stress which is believed responsible for most blade failures in conjunction with surface damage in piston-driven aircraft is the *vibratory* stress set up by the engine forces conveyed to the propeller by the crankshaft to which it is bolted. This produces oscillating forces within the blade which change patterns as the engine RPM changes. The locations on the surface of the blade where maximum bending occurs are called nodes; at these locations the greatest amount of stress occurs. Even slight damage at these points can seriously weaken the propeller.

Forces acting on rotating propeller





Some types of bends in prop blades can be straightened, as above, on a hydraulic press.

Propellers are so sensitive to vibratory stress that occasionally you will find some that are placarded against being operated continuously within a specified RPM range. Each propeller installation is evaluated for vibration compatibility with the engine and airplane. The fact that a prop may fit onto the mounting bolts of an engine does not necessarily mean it is suitable for the airplane.

Knowing that the exact position of the nodes varies with engine settings makes it possible to understand why an "insignificant" appearing nick on the blade can be endured for many hours of use and then suddenly result in a breakage. Losing a portion of the propeller in flight can result in the engine tearing loose from the mounts (even if the throttle is closed immediately) and possibly separating from the airplane—with fatal consequences.

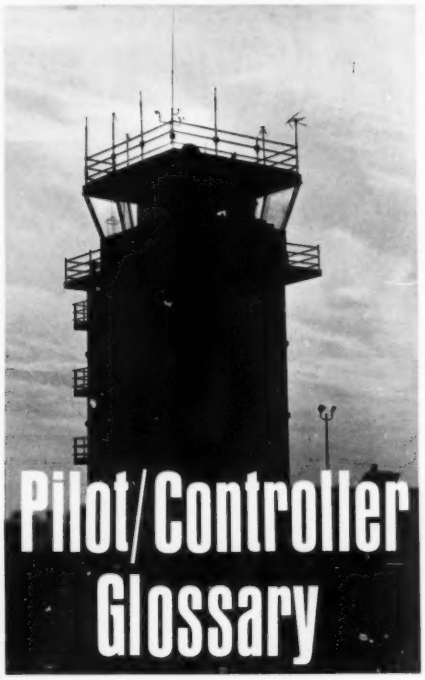
Any mechanical damage to the prop creates an opportunity for blade failure. Nicks, or cuts, or corrosion pits can set up stress points by interrupting line of force. Certificated mechanics are trained to round out depressions in the blade in such a manner as to minimize the concentration force at a given point. Some indication of how critical propeller condition is regarded by FAA may be seen in the requirement (FAR 43 Appendix A) that almost all propeller repair work or maintenance (except for minor nicks and cuts) must be signed off by a mechanic having Inspection Authorization—it is considered a major repair.

The metal propeller used on modern small aircraft is an aluminum alloy designed with a high margin of safety and structured to sustain the normal stress of flight. But it is vulnerable to abuse or neglect. In a recent FAA review of propeller problems, 774 instances of blade failure were reported within a 24 month period, resulting in forced emergency landings, extensive airplane damage, and, in some cases, quite serious injuries. Virtually every failure could have been prevented if the condition had been brought to the attention of a mechanic in time, and appropriate maintenance carried out.

The ordinary preflight inspection tends to scant the propeller. The pilot may do nothing more than run his eye down the leading edge of the blade and, if nothing catches his attention, move on. What he should do, realizing the consequences of an inflight propeller failure, is to scrutinize and feel—with clean, dry hands—the entire surface of the blade. Nicks or cuts that escape the eye are often easily perceptible to the fingers. Inspection is easier and more accurate if the blade is kept clean. This is facilitated by occasional waxing with a paste wax, which helps prevent corrosion. Decals on a prop, incidentally, have been known to permit the accumulation of hidden corrosion.

Note that the removal of small nicks or defects is not "preventive maintenance," which my be performed by the pilot or owner, but is defined in FAR Part 43 as "minor repairs," and requires the service of a qualified mechanic. In observing the results of the latter's job, the pilot or owner will probably notice that nicks have been worked into saucer-like shapes, which is proper (to divert the line of force gently). It is important to ascertain that the deepest point of the nick has been eradicated; otherwise a stress point may still be present. The amount of repair work a propeller may safely endure before requiring a complete overhaul in a propeller shop varies according to the make and model.

Properly maintained, a metal propeller should give you 1,000 hours of trouble free operation before it needs reconditioning. Just make sure you give it the attention it deserves. One little nick could knock you out of the sky. ■



Pilot/Controller Glossary

A new glossary defining air traffic terms used in communication between pilots and controllers has been published in the revised Part 1, Airman's Information Manual, for May 1976. The new "Pilot/Controller Glossary" contains more than 600 terms and phrases, four times as many as in previous AIM glossaries.

The glossary was developed to minimize the chances of a misunderstanding between air traffic controllers and pilots. Many of the terms have been in general use for some time but have never been published in an operational manual readily available to pilots. Following is a selection of non-IFR terms.

ABORT—To terminate a preplanned aircraft maneuver; e.g., an aborted takeoff.

ACROBATIC FLIGHT—An international maneuver involving an abrupt change in an aircraft's attitude, an abnormal attitude, or abnormal acceleration, not necessary for normal flight.

AIRPORT ELEVATION/FIELD ELEVATION—The highest point of an airport's usable runways, measured in feet from mean sea level.

ALERT AREA—Airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity. Alert Areas are depicted on aeronautical charts for the information of nonparticipating pilots. All activities within an Alert Area are conducted in accordance with Federal Aviation Regulations and pilots of participating aircraft as well as pilots transiting the area are equally responsible for collision avoidance.

ALERT NOTICE (ALNOT)—A message sent by a Flight Service Station (FSS) that requests an extensive communication search for overdue, unreported or missing aircraft.

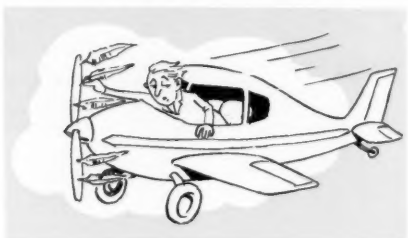
BROADCAST—Transmission of information for which an acknowledgement is not expected.

CARDINAL ALTITUDES OR FLIGHT LEVELS—"Odd" or "Even" thousand-foot altitudes or flight levels; e.g., 5,000, 6,000, 7,000, FL 250, FL 260, FL 270.

DF FIX—The geographical location of an aircraft obtained by one or more direction finders.

DF GUIDANCE/DF STEER—Headings provided to aircraft by facilities equipped with direction finding equipment. These headings, if followed, will lead the aircraft to a pre-determined point such as the DF station or an airport. DF guidance is given to aircraft in distress or to other aircraft which request the service. Practice DF guidance is provided when workload permits.

FEATHERED PROPELLER—A propeller whose blades have been rotated so that the leading and trailing edges are nearly parallel with the aircraft flight path to stop or minimize drag and engine rotation. Normally used to indicate shut-down of a reciprocating or turboprop engine due to malfunction.



FIX—A geographical position determined by visual references to the surface, by reference to one or more radio NAVAIDs, by celestial plotting, or by another navigational device.

FLIGHT STANDARDS DISTRICT OFFICE (FSDO)—An FAA field office serving an assigned geographical area, staffed with Flight Standards personnel, who serve the aviation industry and the general public on matters relating to the certification and operation of air carrier and general aviation aircraft. Activities include general surveillance of operational safety, certification of airmen and aircraft, accident prevention, investigation, enforcement, etc.

(NOTE: If only general aviation is covered the district office is called a "General Aviation District Office" or GADO).

GO AHEAD—Proceed with your message. Not to be used for any other purpose.

HAVE NUMBERS—Used by pilots to inform ATC that they have received runway and wind information only.

IDENT—A request for a pilot to activate the aircraft transponder identification feature. This will help the controller to confirm an aircraft identity or to identify an aircraft.

LOCAL TRAFFIC—Aircraft operating in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from flight in local practice areas, or, aircraft executing practice instrument approaches at the airport.

MAKE SHORT APPROACH—Used by ATC to inform a pilot to alter his traffic pattern so as to make a short final approach.

MAYDAY—The international radiotelephony distress signal. When repeated three times it indicates imminent and grave danger, and that immediate assistance is requested.

RADIAL—a magnetic bearing extending from a VOR/VORTAC/TACAN navigation facility.

RUNWAY GRADIENT—The average slope, measured in percent, between two ends or points on a runway. Runway gradient is depicted on Government aerodome sketches when total runway gradient exceeds 0.3%. (NOTE: 3 feet per 1,000 feet of runway length.)

SEGMENTED CIRCLE—A system of visual indicators designed to provide traffic pattern information at airports without operating control towers.

STOP AND GO—A procedure wherein an aircraft will land, make a complete stop on the runway, and then commence a takeoff from that point.

TOUCH AND GO/TOUCH AND GO LANDING—An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway.

TRACK—The actual flight path of an aircraft over the surface of the earth.

TRANSMITTING IN THE BLIND/BLIND TRANSMISSION A transmission from one station to other stations in circumstances where two-way communication cannot be established, but where it is believed that the called stations may be able to receive the transmission.

WAKE TURBULENCE—Phenomena resulting from the passage of an aircraft through the atmosphere. The term includes vortices, thrust stream turbulence, jet blast, jet wash, propeller wash and rotor wash, both on the ground and in the air.

WEATHER ADVISORY—In aviation weather forecast practice, an expression of hazardous weather conditions not predicted in the area forecast, as they affect the operation of air traffic and as prepared by the National Weather Service. ■

FARs

STATUS of the FEDERAL AVIATION REGULATIONS

The Federal Aviation Regulations, formerly published only in volumes, have been re-issued as individual Parts. Infrequently amended Parts are sold as single-sale items, while frequently amended Parts are sold on subscription. Subscribers to volumes were notified of prices and ordering procedures for the new Parts by the Superintendent of Documents as their volume subscriptions expired.

The number in parentheses after each Part indicates the latest change, if any, to that Part, which is sent out gratis to the subscriber. Changes to single-sale items are sold separately. FARs may be purchased only from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

FAA SEPARATE PARTS	TITLE	PRICE
Parts sold by subscription		+ foreign mailing
Part 1	Definitions and Abbreviations (2)	$3.00 + 75c
Part 21	Certification Procedures for Products and Part (4)	$3.75 + 95c
Part 23	Airworthiness Standards: Normal, Utility and Acrobatic Category Airplanes (2)	$3.55 + 90c
Part 25	Airworthiness Standards: Transport Category Airplanes (2)	$6.60 + $1.65
Part 33	Airworthiness Standards: Aircraft Engines (1)	$3.00 + 75c
Part 36	Noise Standards Aircraft Type and Airworthiness Certification (3)	$3.00 + 75c
Part 37	Technical Standard Order Authorizations (2)	$5.65 + $1.45
Part 63	Certification: Flight Crewmembers Other Than Pilots (1)	$3.00 + 75c
Part 91	General Operating and Flight Rules (10)	$11.30 + $2.85
Part 93	Special Air Traffic Rules and Airport Traffic Patterns (5)	$2.45 + 65c
Part 103	Transportation of Dangerous Articles and Magnetized Materials (6) NOTE: Part 103 will be revoked July 1, 1976.	$2.20 + 55c $9.20 + $2.30
Part 121	Certification and Operation: Domestic, Flag, and Supplemental Air Carriers and Commercial Operators of Large Aircraft (14)	
Part 123	Certification and Operations: Air Travel Clubs Using Large Airplanes (1)	$2.00 + 50c
Part 139	Certification and Operations: Land Airports Serving CAB Certificated Scheduled Air Carriers Operating Large Aircraft (Other Than Helicopters (2)	$3.00 + 75c
Parts sold as single copies (foreign mailing add 25% of total price)		
Part 11	General Rule-making Procedures	$0.55
	Change 1	$0.45
	Change 2	$0.40
Part 13	Enforcement Procedures	$0.70
Part 27	Airworthiness Standards: Normal Category Rotocraft	$1.40
	Change 1	$0.75
	Change 2	$0.40
Part 29	Airworthiness Standards: Transport Category Rotocraft	$1.70
	Change 1	$0.70
	Change 2	$0.35
Part 31	Airworthiness Standards: Manned Free Balloons	$0.40
Part 35	Airworthiness Standards: Propellers	$0.35
**Part 39	Airworthiness Directives	$0.35
Part 43	Maintenance, Prevention Maintenance, Rebuilding and Alteration	$1.80
Part 45	Identification and Registration Marking	$0.65
Part 47	Aircraft Registration	$0.85
Part 49	Recording of Aircraft Titles and Security Documents	$0.45
Part 61	Certification: Pilots and Flight Instructors	$2.90
Part 65	Certification Airmen Other Than Flight Crewmembers	$1.25
Part 67	Medical Standards and Certification	$0.50
*Part 71	Designation of Federal Airways, Area Low Routes, Controlled Airspace and Reporting	$0.85
	Change 1	$0.30
*Part 73	Special Use Airspace	$0.40
	Change 1	$0.30
*Part 75	Establishment of Jet Routes and Area High Routes	$0.40
	Change 1	$0.40
Part 77	Objects Affecting Navigable Airspace	$1.10
**Part 95	IFR Altitudes	$0.50
	Change 1	$0.35
**Part 97	Standard Instrument Approach Procedures	$0.45
Part 99	Security Control of Air Traffic	$0.70
	Change 1	$0.40
Part 101	Moored Balloons, Kites, Unmanned Rockets and Unmanned Free Balloons	$0.65
	Change 1	$0.30
Part 105	Parachute Jumping	$0.55
Part 107	Airport Security	$0.40
Part 127	Certification and Operations of Scheduled Air Carriers with Helicopters	$1.80
	Change 1	$0.35
Part 129	Operations of Foreign Air Carriers	$0.45
	Change 1	$0.35
Part 133	Rotocraft External Load Operations	$0.55
Part 135	Air Taxi Operators and Commercial Operators of Small Aircraft	$2.50
	Change 1	$0.35
	Change 2	$0.35
Part 137	Agricultural Aircraft Operations	$0.50
	Change 1	$0.35
Part 141	Pilot Schools	$1.15
Part 143	Ground Instructors	$0.45
Part 145	Repair Stations	$0.75
Part 147	Aviation Maintenance Technician Schools	$0.65
Part 149	Parachute Lofts	$0.35
Part 151	Federal Aid to Airports	$1.55
Part 152	Airport Aid Programs	$1.35
Part 153	Acquisition of U.S. Land for Public Airports	$0.50
Part 154	Acquisition of U.S. Land for Public Airports Under the Airport and Airway Development Act of 1970.	$0.40
Part 155	Release of Airport Property from Surplus Property Restrictions	$0.40
Part 157	Notice of Construction, Alteration, Activation and Deactivation of Airports	$0.40
Part 159	National Capital Airports	$1.00
Part 169	Expenditure of Federal Funds for Non-Military Airports or Air Navigation Facilities Thereon	$0.35
Part 171	Non-Federal Navigation Facilities	$1.10
	Change 1	$0.65
Part 183	Representatives of the Administrator	$0.45
Part 185	Testimony by Employees and Production of Records in Legal Proceedings and Service of Legal Process and Pleadings	$0.30
Part 187	Fees	$0.40
Part 189	Use of Federal Aviation Administration Communications System	$0.40

NOTICE

Prices shown are those in effect as of June 1, 1976, and are subject to change without notice.

* Changes to individual airspace designations and airways descriptions, individual restricted areas and individual jet route descriptions are not included in the basic Parts 71, 73 and 75, respectively, because of their length and complexity. Such changes are published in the Federal Register and are included on appropriate aeronautical charts.

** Due to the complexity, length, and frequency of issuance, airworthiness directives, en route IFR altitudes and standard instrument approach procedures are published in the Federal Register and are not included in basic Parts 39, 95, and 97. In addition, en route IFR altitudes and instrument approach procedures are depicted on aeronautical charts.

Standard instrument approach procedures are published in the Federal Register by reference to FAA documents which are available for examination at the Rules Docket (AGC-24) and the National Flight Data Center, in FAA Headquarters, Washington, D.C. and at FAA regional offices and Flight Inspection District Offices.

Federal Air Surgeon Dr. Homer L. Reighard (right) in his office in Washington, D.C

The pilot of the twin turbo prop had aborted his takeoff and pulled over on the wet grass, after becoming aware of a light trainer landing from the opposite direction. When he attempted to taxi back to the threshold, he had trouble getting the wheels back onto the pavement, so the copilot got out and pried the wheels loose with a board he found nearby. He looked unwell when he climbed back into the cockpit, and said he thought he might have "strained something —nothing serious." At the completion of the flight he was taken to see a doctor, who immediately called an ambulance, but the patient died on his way to the hospital—of heart failure.

Since there was no accident, there was no investigation or autopsy and this was not considered an aviation fatality. Nevertheless, after all the facts became known it was clear that the airman's death was related to his refusal to ground himself, in the light of information given to him which clearly indicated this course of action.

His second class medical certificate was unrestricted and valid for another eight months, according to the information on the face of it. But in accordance with the standard reminder on the reverse side *(The holder of this certificate is governed by the provisions of FAR Secs 61.53, 63.19, and 65.49-d)* the certificate was in fact invalidated by an event which had taken place two months after its issuance. This event was a routine company medical examination, in the course of which an electrocardiograph was produced that showed a distinct irregularity not previously observed.

His personal physician had then placed him on a controlled program of restricted diet and exercise, but as he was unaware of his patient's flying activity, the doctor had said nothing about discontinuing it. The pilot had experienced no difficulty in the cockpit until the aborted takeoff and the consequent events which culminated in the fatal heart attack. Nevertheless, he had been flying with a form of heart disease which is considered disabling, by the Federal Air Surgeon, and which might easily have led to an inflight accident jeopardizing the lives of others as well as his own.

The responsibility for grounding oneself under such circumstances is a legal as well as moral obligation. Not only are the lives of other persons, as well as the pilot's, placed in jeopardy, but the pilot could face suspension of his pilot certificate and a civil penalty of $1,000 for each violation.

Most pilots are aware of the fact that certain physical afflictions could disqualify them from flying, but many are reluctant to take up the problem with a qualified aviation medical examiner because of their fear that this could lead to a permanent loss of airman privileges. This "fear of not flying" is strong enough to cause normally straightforward persons to conceal or misrepresent facts in a manner that could have tragic consequences. The Federal Air Surgeon has many such cases on record, and suspects the existence of many others as yet undisclosed. Family physicians are urged to make pertinent medical facts of their patients known to their aviation medical examiner; but not all of them can or do follow this recommendation. Therefore at the present time the responsibility for compliance remains with the individual airman.

One unusual recent case involved an airline captain who had broken his leg skiing, but still persisted in flying in command of his aircraft, even though it required a hydraulic forklift to place him into the cockpit. It is fortunate that none of his passengers or crew suffered as a result of this flagrant infraction of the rules—as they might have, if an inflight emergency had required the full exercise of the captain's capabilities. The Federal Air Surgeon considers that any flight crew member who knowingly attempts to carry out his duties despite a known incapacitation is unnecessarily impairing the safety of the flight. This is true regardless of whether the aircraft is a B-747 or a J-3 *Cub*.

FAR 61.53 states that:

"No person may act as pilot-in-command or in any other capacity as a required flight crew member while he has a known medical deficiency, or increase of a known medical deficiency that would make him unable to meet the requirements of his current medical certificate."

The other two FARs (63.19 and 65.49) cited on the back of the certificate—and all too often ignored by airmen—make a similar statement concerning non-pilot air crew and air traffic controllers.

The phrase, "known medical deficiency," refers to a very broad range of afflictions, from heart disease (the most common disabling ailment) to minor irritations which could include allergies and skin rashes.

The dangers of flying with a known heart condition that could result in a sudden incapacitation are obvious. Less understood are the possible hazards of flying while

Fear of

suffering from hay fever, poison ivy, hives, or similar ailments which, although not disabling by any means, can be annoying enough to distract the pilot from giving his full attention to his task of operating the airplane. There is also the likelihood that medication, such as antihistamines, used to suppress the symptoms of allergies may have side effects which could render the pilot less alert to his environment—predominently drowsiness.

Some of the drugs used to treat hypertension are known to weaken an airman's ability to withstand gravity pressure, and could lead to unconsciousness as a result of a sharp pull-up or steep turn.

Steroid drugs in wide usage may cause euphoria and have other side effects. This could result in failure to adequately respond to an inflight emergency.

The only safe procedure to follow is to assume that *any drug you are required to*

NOT Flying

take is sufficient cause for relinquishing airman duties, unless you are specifically advised to the contrary by a physician familiar with airman responsibilities.

The vulnerability of every airman to a periodic medical examination, which could jeopardize his aviation privileges, creates in some individuals an attitude of concealment, and even hostility toward FAA's Office of Aviation Medicine, which is headed by the Federal Air Surgeon. Much of this distrust stems from the quite incorrect assumption that medical disqualification is determined with the remote objectivity of a computer. There is considerable fear that if this dreaded machine ever assimilates any of the data associated with their deficiency, they will be grounded forever.

The truth of the matter is that the Federal Air Surgeon, Dr. Homer L. Reighard, maintains a policy of "individual consideration." This means that with few exceptions every applicant for a medical certificate is judged on his own immediate situation or condition; the overriding criterion is not simply the letter of the Federal Aviation Regulations but the applicant's evident ability to carry out desired airman duties safely.

Every airman who is denied a medical certificate by his aviation medical examiner has the right to appeal his case, within 30 days, to the Federal Air Surgeon. He can support his case with statements from his own physician, and if appropriate the Federal Air Surgeon's Office will call in an outside specialist (cardiologist, neurologist, etc.) as a consultant. Over the years 1961 through 1975 FAA has examined nearly 10,000 such appeals for reconsideration, and on the average about one out of three are granted a certificate. In 1975 there were 1,159 appeals, of which 421 were granted and 738 denied. The majority of these cases involved neuropsychiatric conditions or cardiovascular disease.

The airman who is unwilling to accept the reconsideration finding of FAA can go outside the agency and direct an appeal to the National Transportation Safety Board. The Board will appoint an administrative law judge to hear the case and render a decision, which could overrule the Federal Air Surgeon's denial. If the airman cannot accept the trial judge's opinion, he can ask the full NTSB membership to consider his case. And finally, if he wishes, he can pursue an appeal through the civil courts on up to the Supreme Court.

In addition, the airman who has been denied certification may petition the Federal Air Surgeon for an *exemption* from the established medical standards. The Surgeon will normally convene a group of medical specialists to study the petition and determine whether with certain limitations or restrictions it is possible to grant or restore, a medical certificate. These restrictions could refer to a specific type of aircraft or flight condition, could limit the airman to non-pilot in command status, could require the use of special equipment, etc. In many cases frequent medical checkup reports would be required. The attitude of the Federal Air Surgeon is not to deny anyone the privilege of exercising his airman's certificate if it can be shown that he is able to do so with a reasonable certainty of not allowing a known medical deficiency to affect the safety of the airspace.

Over the past 15 years some 5,600 petitions for exemption have been filed with the Federal Air Surgeon, of which 1,732 have been granted—nearly one petition granted for every two denied. In 1975 there were 805 petitions filed, with 276 granted. By far the largest category of denials involved cardiovascular diseases.

There is some confusion over the terms *limitation, waiver,* and *exemption,* as they apply to the airman's medical certificate. Aviation medical examiners are empowered to issue medical certificates with certain common *limitations,* such as the requirement to wear or have at hand reading or distance vision glasses. (There are over 200,000 active airmen with visual restrictions.)

A *waiver,* on the other hand, is a special issuance to a person who does not meet certain regulations, and can only be issued by FAA. The waiver usually allows the airman to carry out his duties in spite of a deficiency—after he has demonstrated his ability to compensate in some acceptable manner. In many cases a flight test is required. An example might be loss of sight in one eye; or loss of an arm or leg, which has been compensated for with an artificial device.

An *exemption,* as noted earlier, is the form of medical certification required in cases involving one of the nine mandatory disqualifying medical conditions: an established medical history or clinical diagnosis of (1) alcoholism, (2) drug dependence, (3) psychosis, (4) personality disorder, (5) epilepsy, (6) disturbance of consciousness without satisfactory explanation, (7) myocardial infarction, (8) angina pectoris or (9) diabetes (requiring medication). It may also be used in other instances where the medical condition considered disqualifying under the regulation is controversial or extremely complicated. Both waivers and exemptions usually include various restrictions on the certificate.

In reviewing all such cases, emphasis is placed on the individual rather than on the disease or condition. Two persons may suffer very similar heart attacks, for example, but one person may make a much better recovery, for any number of reasons —age, general state of health, response to treatment, etc. As a rule, the person who has a strong desire to continue in aviation will cooperate most religiously with his physician in the recovery program, accepting dietary restrictions, physical therapy and other non-appealing directives with a cheerful, hopeful attitude that may result in a more effective compensation. Such individuals, of course, have a better chance of regaining a medical certificate. Those persons who attempt to conceal a medical problem usually have a negative attitude about their own future, and in some cases worsen their problems by adding the mental burden that concealment entails to an already stressed condition.

Realizing that the Federal Air Surgeon has a sympathetic attitude should help dispel the notion that discussing a medical problem with the aviation medical examiner will automatically terminate your flying career. In the long run, the sooner the problem gets proper attention, the better your chances of staying active in aviation—and surviving. ■

Famous Flights

Hustling Howard Hughes

Howard Hughes taxies in at Floyd Bennett Field, Brooklyn, after record-breaking world flight.

On that warm July evening in 1938 the lanky young pilot who was climbing into the Lockheed *Lodestar*, his brown fedora pushed to the back of his head, was already an international celebrity.

He was a Texan, 33 years old, a gangling six foot three, a multi-millionaire with a reputation for rushing into new enterprises with little advance preparation. Now, he was about to attempt to break the round-the-world flight record set by the redoubtable Wiley Post five years earlier in the *Winnie Mae*.

His name was Howard Robard Hughes, and by the time of his death 38 years later he was to become the greatest source of hidden eccentricity the nation had ever known. But that evening in 1938 he stepped willingly into the spotlight to promote the success of his latest interest: air commerce. He was after a global speed record to demonstrate the practicality of regular intercontinental air travel.

At 7:19 p.m., with a crew of four on board the twin engine Lockheed, he rolled the heavily-loaded monoplane down the runway, lifted it into the sky and headed north. Out over the Atlantic, Hughes told the crew to rest, while he sipped milk from paper cartons. At 2:30 a.m. he made his first radio transmission back to America:

"I hope we can get to Paris before we run out of gas," he said, "but I am not so sure. All I can do is hope. I am throttling back the engines as fast as the reducing load permits."

And on that somber note he signed off.

The odyssey which led Howard Hughes to that tense moment over the North Atlantic is well documented. Born in Houston on Christmas Eve in 1905, the son of a wealthy tool and die manufacturer, he inherited his father's firm when he was only 18. Starting with assets of about three-quarters of a million dollars, he soon developed Hughes Tool Co. into a multi-million dollar corporation. He then turned to film making, moving to Hollywood where he produced some spectacular movies but apparently lost money. Hughes was described in the newspapers of that period as a wealthy industrialist, a sportsman, and a movie-maker—but he had one life-long passion which was not as well known during his Hollywood years: aviation.

Hughes had his first airplane ride when he was 14. His father, visiting him at the Fessenden School in Newton, Mass., where he was a prep student, allowed him to go for a Sunday afternoon ride in a touring amphibious airplane. Young Hughes, who had already exhibited a remarkable mechanical flair and who had built one of the first licensed "ham" radio stations in Texas, was fascinated with the flight, and he kept asking the barnstorming pilot questions about the principles and mechanics.

That summer, unknown to his parents, he took flying lessons from other barnstorming pilots in Houston, paying for them out of his allowance. Later, while attending California Institute of Technology he took more flying lessons and became a proficient pilot. His schooling was abruptly terminated by his father's death and his new responsibilities in running Hughes Tool Co., but he continued to fly as much as he could. Other pilots from those days remember him as one who spent a lot of time in the hangar sharing experiences and trying to learn as much as he could from the old timers.

On-the-Job Research

By the early 30's, after his success in industry and film making, he decided to turn his attention full time to aviation, which appeared on the threshold of rapid expansion. Characteristically, he conducted his research in his own peculiar manner.

In the summer of 1932 the young millionaire, using the alias of Charles Howard, obtained a $250 a month job as a co-pilot and baggage handler for American Airways. He worked that summer on the Fort Worth to New York run, unknown to his co-workers, learning everything he could about airline operations that would prove valuable to him later on when he purchased the small Transcontinental & Western Airline (in 1937) and developed it into *Trans World Airline*, one of the world's major carriers. In 1932 he learned that the so-called Fort Worth to New York direct run was a direct flight in name only. The airline actually terminated at Cleveland and the final leg of the journey to New York was made by train! The barrier was the Appalachian Mountains with their uncertain weather—the primitive instrumentation on board the aircraft and the meager meterological data available made adherence to any reasonable schedule almost impossible. No wonder the public was leery of air travel!

In the fall of 1932 he hired Glen Odekirk, a pilot-mechanic, and with him set up shop for "Hughes Aviation" in a hangar in Burbank, Calif. He first purchased a Boeing P-12, an Army Air Corps single engine pursuit airplane, rebuilt it and flew it in the All-American Air Meet in Miami in 1934. Hughes won the sportsman cup for his acrobatic flying, but felt he could do better with an aircraft of his own design.

He expanded the staff in Burbank until he had 18 people working for him—mechanics, engineers, and even a meteorologist. His idea was to build the fastest landplane in the world, a project which became known as H-1, for *Hughes One*. The small racer took 18 months to build: it was a stubby-winged (25′ span) monoplane with a long fuselage, wide spaced retractable landing gear, and an air-cooled 1,000 hp Pratt and Whitney engine. H-1 bore a decided resemblance to the later Japanese *Zero* fighter of World War II, and admittedly the Japanese borrowed freely from Hughes's design.

Hughes himself flew it in a monitored test at Santa Ana in September of 1935 for an average straightaway speed of 352.39 mph. That broke the previous world's speed record set by the Frenchman Raymond Delmotte, who had flown at 314.32 mph.

Hughes next concentrated on long distance flight. The transcontinental record in 1935 was ten hours and two minutes from California to New York, set by Roscoe Turner in 1932. Hughes obtained a Northrop *Gamma* mailplane, replacing its fuel tanks

with larger ones, and adding a new Wright C Cyclone engine of 925 hp., and a newly perfected Hamilton constant-speed propeller.

Hughes flew the re-designed *Gamma* solo from Burbank to Newark, N.J., on January 13, 1936, in nine hours and 27 minutes, a new transcontinental record. A year later he broke his own record by flying coast to coast in seven hours and 28 minutes.

He was now the darling of the newspapers, the millionaire film-maker/sportsman whose "dabbling" in aviation was setting world records. But he still had a larger plan in his mind, a bigger record to break: circling the entire globe. Publicly he said that his global flight was not a stunt, and that he was not merely interested in showing that he could make the round-the-world trip faster than Wiley Post. Rather, he wanted to demonstrate the capabilities of intercontinental flight with a full crew on board.

For his flight Hughes hired a navigator, a radio engineer, an air crew mechanic, and a co-pilot. For his aircraft, he purchased a new all-metal Lockheed *Lodestar*, and again he stripped the airplane to its shell. He installed two 1,200 hp Wright engines, a dual fuel system and outsized fuel tanks. He also installed a new Sperry automatic pilot, and an automatic direction finder.

Survival gear on board included a life raft, parachutes, and even rifles. Furthermore, Hughes stuffed thousands of pingpong balls in every available empty space in the airplane to give it flotation in the event they went down at sea.

All of his elaborate preparation seemed to be jeopardized by excessive fuel consumption, on that adventuresome night in 1938 when he set out across the Atlantic, bent on circling the globe faster than anyone had done before, but his "gambler's luck" held.

Nearing the continent they picked up a brisk tail wind, and as Hughes studied his gauges he knew they would make it when he crossed over Ireland with 100 gallons remaining, enough to continue on to Paris.

The next leg was from Paris to Moscow over Germany. As they crossed the German border the radio crackled with harsh demands from Nazi officials that the Americans turn around and go back. Hughes was flying at 13,000 feet over clouds at a speed of about 220 mph. He shrugged off the radio demands, saying that "I'm not going to see anything, and I don't think they'll shoot us down."

The *Lodestar* was unmolested, and Hughes arrived safely in Moscow where he and his crew received a large and enthusiastic reception at the airport. They remained only two hours, however, and then took off for Omsk, 1,300 miles to the east.

After setting the course, Hughes stretched out on the floor for a nap. Twenty minutes later he woke up refreshed and took over the controls again. He flew through a thick night of driving rain with no ground visibility. They obtained a bearing on the Omsk radio station and managed to spot the red lights of the small Omsk airstrip flickering in the murk below.

At Omsk Hughes discovered that the high octane fuel his powerful engine required was not on hand. However, he had provided for that contingency, storing on board a supply of tetrathyl lead. He added it by hand to the low grade gasoline provided him, fueled up and continued on his way.

With the "doctored" fuel in the tanks they then flew to Yakutsk, in Eastern Siberia; and then set out for the trans-Pacific flight. Twelve hours and 16 minutes out of Yakutsk, they touched down at Fairbanks, Alaska, where Hughes was met and congratulated by Mrs. Wiley Post, the widow of the man whose record he was now sure to break. "I wish you God's speed," Mrs. Post said to him, tears in her eyes.

At Fairbanks the *Lodestar* jettisoned its pingpong balls and proceeded to Minneapolis, and on to New York. A welcoming crowd of 25,000 cheered his arrival after a 91 hour and 13 minute flight—which broke Post's record by two days.

The following day there was a tumultous ticker tape parade for Hughes in New York City, Hughes, a naturally shy man, seemed stiff and uneasy at first, sitting in the back of the open car, but as he proceeded up Broadway, paper cascading down over him, he seemed to relax and enjoy the applause. People broke from the crowds, rushing over to grasp his hand. He reached out to them, smiling, thanking them for their congratulations. It was one of his few agreeable moments in the sun.

That afternoon he was interviewed by newspaper reporters, and his old reserve seemed to return. He was asked: "Will you ever fly around the world again, Mr. Hughes?"

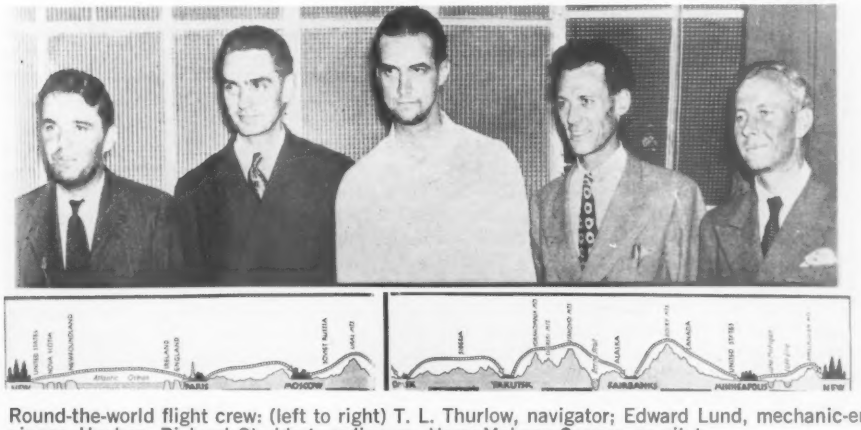
"No," he answered bluntly.

Congress voted Hughes the Congressional Medal of Honor, for his global feat, but the aviator/empire builder never bothered to go to Washington to pick it up. (Harry Truman found the medal gathering dust in a desk drawer when he took over the White House in 1945, and sent it on by mail.)

Meanwhile Hughes had been busy acquiring stock in TWA and by early 1940 he accumulated a controlling interest in the airline. Under his direction, by midyear, TWA had inaugurated "Stratoliner" service from coast to coast and was expanding into a "transworld" as well as transcontinental airline. As the United States entered World War II, the "Stratoliners" were diverted to overseas operations conducted by TWA for the Pentagon. Hughes rebuilt the airline's fleet with the newly produced Lockheed *Constellations* and set a new transcontinental record of just under seven hours, Burbank to Washington, D.C., (April 17, 1944) in a company plane with himself and Jack Frye at the controls. International service soon included nonstop flights over the North Pole to London and Paris.

Hughes continued to expand TWA operations with all of his vast financial resources, and to exert his own personal influence over many aspects of company policy, aircraft design and instrumentation, despite growing resistance within the airline that culminated in what many consider the most expensive civil court battle in history. A Supreme Court decision in 1973 finally overturned a $155 million judgment against Hughes obtained in the lower courts.

By this time Hughes had already sold off all of his TWA stock at an enormous profit (for nearly $550 million) and acquired other interests, including a regional airline in the southwest. He had also developed a passion for privacy which resulted in so much rumor and speculation about his life and business dealing that at the time of his death, on board an aircraft on April 5, 1976, few persons associated his name with the pioneering heroes of aviation. But one of the few indisputable facts of his bizarre existance is that flying was the enduring passion of his life. ■



Round-the-world flight crew: (left to right) T. L. Thurlow, navigator; Edward Lund, mechanic-engineer; Hughes; Richard Stoddart, radioman; Harry McLean Conner, co-pilot.

THE ENGINE DOCTOR

Overhauled and Rebuilt

Q. *Doctor, my airplane engine is in critical condition. The mechanic wants to open it up, and he needs my approval. Can you help me?*

A. I hope so. What seems to be the problem?

Q. *Well, it's weak as a kitten—no power at all, do you see?*

A. I suppose you have had a compression check run.

Q. *Oh, yes. The poor thing has an average reading of 60 over 80. That's pretty bad, isn't it? The mechanic thinks its either worn rings or valves, or perhaps both. Do you agree?*

A. It's possible. I presume the shop is proposing to do a top overhaul or a major.

Q. *That's just what's confusing me. What on earth is the difference?*

A. Let's see if I can simplify it for you. The term "top overhaul" is not an official one—you want to be quite sure that you and the shop understand each other—but generally in the industry it means all the parts of the combustion chamber will be disassembled or otherwise inspected, and those parts which do not meet the established standards of serviceability for your engine will be replaced by new or rebuilt parts which at least meet those standards. Since the piston rings and the valves are the seals in the combustion chamber which usually need repair, the top overhaul consists of removing the cylinders to grind the valves and their seats and to replace the piston rings. Occasionally the pistons and wrist pins will also require repair during this type of overhaul.

Ready for re-assembly into a "factory rebuilt zero time" engine, parts of a TSIO-520-D Continental are inventoried at Mobile, Ala.

A *major* overhaul is similar, except that it covers *all* of the engine components, including the crankshaft and related accessories (i.e., fuel metering, ignition, etc.). You know of course that every engine needs a major overhaul sooner or later. On your engine—if that's your owner's manual you have in hand—the recommended time between overhauls is a maximum of 2,000 hours. If you are anywhere near close to that now, there is no point in performing anything but a major.

Q. *Actually we've gone only about 1,000 hours. The mechanic says we could get another 1,000 after the top overhaul, and that's only about half the cost of the major, isn't it?*

A. A top overhaul should cost you a great deal less than a major, naturally, since fewer parts are involved. If we are only concerned with rings and valves, there could be quite a saving. But we do not know that until you look at the other parts. You could proceed with only a top overhaul until the cylinders are removed. These are very expensive parts—they cost in the neighborhood of $600 to $900 new—about half that used. If the cylinders are cracked or require major work, like boring or re-chroming, so that you have to replace them, you might as well go ahead with a major overhaul, because you are in for a really major expense either way. And with proper care and good usage—after that you might get 2,000 hours of trouble-free engine.

Q. *You mean that it would be as good as new?*

A. Not exactly. An overhauled engine is still a used engine; the engine time is not turned back to zero. That is only done for a rebuilt engine.

Q. *I thought that is what I was getting.*

A. No, only the manufacturer can provide you with what is technically called a rebuilt engine. According to the FARs, this is an engine that has been completely disassembled, inspected, repaired as necessary, reassembled, tested and approved in the same manner and to the same standards as a new engine, with either new or used parts. The engine service time is regarded as zero, and the logs may be discarded.

Q. *It sounds like it would cost as much as a brand new engine.*

A. Not quite, but almost. But then you get a new engine warranty.

Q. *What kind of warranty do I get with my overhauled engine?*

Four-cylinder Lycoming engine, in for remanufacture, is disassembled for inspection and replacement or repair of all worn parts.

A. Whatever the shop is willing to give you. That would depend on the kind of job he did for you. The main difference between overhauling and rebuilding is the standard of tolerances you observe. Take your crankshaft, for example. Say the new part tolerance for fit is .0001 inches. With an overhaul, you might get by with a serviceability standard as high as .004 inches. We are only talking about thousandths of an inch, but just the same it's obvious which shaft is going to wear out first, other things being equal.

Q. *Why can't my mechanic repair my engine to the new parts standards? Isn't he qualified?*

A. As far as training is concerned, any FAA certificated power plant mechanic is capable of repairing any engine to new parts standards. In fact, that is a matter you should get straight before you sign any work order. If you wish to have all repairs made to new parts tolerances, instead of serviceability tolerances (and it will cost more), you can specify that. Of course, not every shop is equipped to do that kind of work—in fact, many will not even attempt anything more than a top overhaul. So if you think you're going to get into a major, make sure you're in a shop that can handle it.

Q. *How long can I expect the airplane to be laid up, with a major overhaul?*

A. That depends entirely on the shop, how many people they have, how much work on hand, etc. You might keep it in mind, if you shop around for the best price, that a shop run on a shoe string might tie your engine up all summer, unless they put a delivery date in writing. Of course, there are shops that offer exchange engines; all they have to do is install and test it.

Q. *How would I know the exchange engine is any good? It could be worse than my old one.*

A. All you can know with reasonable certainty is that it is a used engine which has been fully inspected and repaired to serviceability or new parts tolerances. Incidentally, a *rebuilt* engine is always an exchange engine.

Q. *Can I turn the tachometer back to zero after my engine is just overhauled?*

A. I wouldn't recommend that even if you got a rebuilt engine. The tach clock is a convenient way of estimating aircraft service, but it does not necessarily correspond to engine service time—you keep a separate log for that. If you use the airplane for rentals or flight instruction, for example, you would have to have it inspected every 100 hours of flight time, regardless of whether you have six hours or 600 hours on the engine at that point. That is stated very clearly in the regulations, FAR 91.169.

Q. *I'm sure it is. Are there any other regulations I ought to check on before I decide the fate of my airplane?*

A. Actually the regulations say nothing about when you have to overhaul or rebuild an engine—except for certain life-limited parts, and for airworthiness directives. You are required to keep it airworthy, and to have it tested periodically, according to the kind of use, and repaired as needed by qualified persons, but the scope of the service you contract for with a shop is not regulated. I have simply been explaining what some of the terms used in the industry mean. I hope it is all clear.

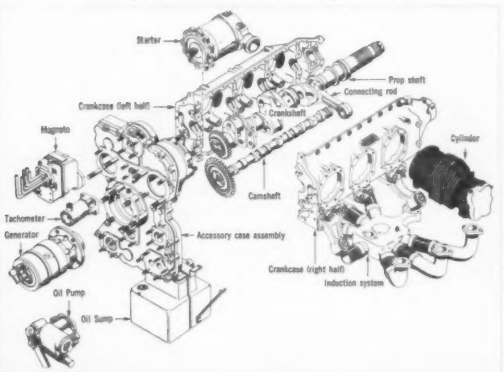
Q. *Not quite as clear as a bell, but I'm getting a lot of vibrations. How many times could the engine be overhauled, and still be airworthy?*

A. There is no inflexible limit, only what is practical. It is usually not worth while to overhaul the same engine more than two or three times, since with increased use more and more parts will have to be replaced. And the sum of the cost of the individual parts is far higher than the cost of the whole engine.

Q. *Do you know what I'm going to do with that airplane? I'm going to sell it, as is. Don't look so upset—I've always wanted a retractable, anyway. Don't you think that's the best solution?*

A. It has the merit of extreme simplicity.

Exploded view of an opposed six-cylinder engine, typical of modern light aircraft.



BRIEFS

Airport operators and others concerned with the potential problems of birds near airports will be interested in a manual on the subject prepared by the International Civil Aviation Organization (ICAO). Considered the most comprehensive publication in existence on the subject of bird hazards at airports, the manual may be obtained by sending $1.75 (check or money order) to ICAO, Attn: Distribution Officer, P. O. Box 400, Succursale: Place de l'Aviation Internationale, 1000 Sherbrooke St. West, Montreal, Quebec, Canada HcA 2R2. Ask for ICAO Airport Services Manual, DOC-9137-AN/898, Part 3, "Bird Control and Reduction."

Two recent FAA mailings to pilots resulted in dozens of sacks of undelivered mail being returned, marked "Moved . . ." Pilots are reminded that the revised FAR Part 61 requires the holder of a pilot or flight instructor certificate to make written notification of any change of permanent mailing address within 30 days to DOT/FAA, Airman Certification Branch, Box 25082, Oklahoma City, OK 73125. (See FAR 61.60).

All the symbols that designate the various aircraft "type ratings" for pilots—including those for aircraft recently type certificated—are listed in an updated FAA advisory circular. The list is designed to provide a ready reference for pilot schools, pilot examiners and the general aviation public to use in determining what type aircraft a pilot is rated for. (To fly larger, more sophisticated types of aircraft a pilot must have a special "rating"; not all designators of such aircraft are easily recognizable.) AC 61-1E, "Aircraft Type Ratings" is available free from DOT/FAA Distribution Unit, TAD 443.1, Washington, D. C. 20590.

All aircraft have "approved operating limitations" but not all pilots are aware of the operating limits of the airplanes they fly, judging from evidence uncovered in accident investigations. Operating limitations are contained in airplane flight manuals, markings or placards—or a combination of the above. Pilots are responsible for having the appropriate information available in the airplane before flight. If you are not sure about the requirements for your airplane, check with your FAA District Office. A newly revised FAA advisory circular on the subject; "Airplane Flight Manuals, Approved Manual Materials, Markings and Placards—Airplanes" (AC 60-6A) is available free from DOT/FAA Distribution Unit, TAD 443.1, Washington, D.C. 20590.

Not only birds but insects too can choke off vital airflow in an airplane. After a Cessna 150 in Indiana experienced a forced landing because of apparent fuel exhaustion, although there was fuel in the tanks, it was discovered that mud daubers had completely plugged the fuel vent, stopping the fuel flow to the engine. Fuel vents as well pitot tubes should be inspected during preflight.

New Jersey Sergeant Wins Sweepstakes Airplane

Sgt. Robert P. Curry, McGuire Air Force Base, N.J., (left) faces the monumental decision of which $40,000 airplane to choose, after drawing the lucky ticket as grand prize winner of the Safe Pilot Sweepstakes II, conducted by the General Aviation Manufacturer's Association in support of the FAA Accident Prevention Program. Curry is shown with FAA Administrator Dr. John L. McLucas (center) who made the presentation in Dallas on April 24 and Edward W. Stimpson, President of the Association.

During the year-long Sweepstakes more than 250,000 pilots attended some 5,000 free safety seminars. Pilots could submit one card to the Sweepstakes for each seminar they attended. The winner was chosen at random.

Curry, who has been flying since 1963, is a multi-engine, instrument-rated pilot, with Ground Instructor Rating. He plans to retire from the Air Force in December 1976 and devote full time to flying as a flight instructor and charter pilot.

Missouri FBO is Top General Aviation Mechanic

A Missouri pilot/mechanic/fixed base operator and an American Airlines mechanic from Oklahoma have been selected as national winners in the 13th annual Aviation Mechanic Safety Awards Program.

Top general aviation mechanic is William A. Enk of Blue Springs, Mo., who has been flying for half of his 34 years and who now holds an A & P Certificate, Inspection Authorization, Airline Transport Pilot Certificate, and Instrument and Flight Instructor ratings. The operator of Enk Aviation, an aircraft sales and service business, he was honored for his development of a low toxicity fire extinguisher system for use in general aviation. He began work on the system after losing several close friends in aircraft fires.

Air carrier national winner is LaVerne L. Gondles of the American Airlines Maintenance and Engineering Center in Tulsa, who was cited for a consistently high standard of work and initiative. Of particular significance was his modification of the cargo door latching actuation on the DC-10 aircraft, now being used on many such aircraft.

The Aviation Mechanic Safety Awards Program is sponsored annually by FAA, the Flight Safety Foundation and various elements of the aviation industry to honor aircraft mechanics who have shown outstanding initiative in their individual efforts to advance air safety.

More "Bomb Sniffers" Sought

"Technology has not yet been able to come up with a mechanical 'sniffer' that can compete with the nose of a trained dog, and therefore we intend to increase the use of explosive-detection dogs." So said FAA Administrator John L. McLucas in reporting on a study of ways to improve airport security. The study was ordered by President Ford after a bombing at LaGuardia Airport last December which killed 11 persons.

There are presently 18 explosive-detection teams—dogs and their handlers—working for local police departments at major airports in the United States, and more are being added. The teams are scattered throughout the country so that no aircraft in flight is more than an hour from an airport at which it can be searched.

German Shepherds are used in the program because they possess a unique combination of stamina, sense of smell and intelligence and they also afford a "threat factor" for this and other types of police duties.

Between March 1973 and December 1975 the dogs have made 638 aircraft searches and have sniffed out 13 explosive items.

Color-Code Rule Withdrawn

A proposal to require "color coding" of the area around aircraft fuel filler openings to show the type of fuel that should be used, has been withdrawn by FAA after noting that most of the 400 comments received opposed the proposal. Color coding would have involved a solid red, 12-inch circle around fuel filler openings for gasoline and a 12-inch square around jet fuel openings. FAA agreed that the responsibility for proper fueling of a general aviation aircraft should remain with the pilot and should be part of his normal pre-flight inspection.

AIRPLANES, AIRPLANES. The world's largest conglomeration of general aviation airplanes are expected to foregather at Oshkosh, Wisc., for the annual Experimental Aircraft, Association convention, July 31 to August 9. The Oshkosh airport control tower, which anticipates handling something like 10,000 operations a day, is preparing special instruction for arriving and departing aircraft. Details will be given in the July issue.

• Help for Misplaced Pilots

I'm sure there is not a pilot flying today who has not inadvertently landed at the wrong airport—especially if three different airports are all in a row, like Morristown, Caldwell-Wright, and Hanover (N.Y.). A simple requirement of having the name of the landing facility painted on top of the buildings, hangars or water towers could avoid this embarrassment, which sometimes can be dangerous. Why has this procedure never been required or suggested?

Hal Becker
Garden City, N.Y.

Although FAA has no requirement for "airmarking" at airports (painting names so they can be seen from the air) many civic organizations, pilot groups and state aviation departments do perform this service, and find it an interesting and worthwhile project. Perhaps you can get one of the aviation groups in your area interested. (One note of caution for airmarkers who are thinking of painting names on runways or taxiways: make sure the paint is of a non-skid type.)

• Trimotor, Too

In your March issue with reference to the *Trimotor*, you state that you are unaware of any others (besides N7584) being used in scheduled commercial service. I thought you'd be interested to know that Grand Canyon Airlines plans to put N9637 (1928 Model 5ATB *Trimotor*) into service shortly, flying between North and South Rim Airports (8785 MSL and 6605 MSL). For details contact them at P.O. Box 186, Grand Canyon, Arizona 86023.

Art Gallenson
Kanab, Utah

• Workload Permitting

The flight service station near me has spread the word that they are happy to give pilots practice DF steers "when workload permits." I have heard other services offered on the same basis, which raises a question: How is the determination made at FSS's of when, and whether, "workload permits" such niceties as practice DF steers?

Name withheld

There is an established order of "duty priorities" for flight service stations, as follows:

(a) Emergency or urgent actions when life or property is in immediate danger.

(b) Actions required by indications of NAVAID malfunctioning.

(c) Services to airborne aircraft.

(d) Weather observations and PIREPs (pilot reports).

(e) Preflight pilot briefings.

(f) Unscheduled broadcasts.

(g) Teletypewriter duties.

(h) Transcribed Weather Broadcasts and Pilot Automatic Telephone Weather Answering Service (TWEB and PATWAS).

(i) Scheduled broadcasts.

In spite of the long list, FSS's with direction finding equipment do often find time to perform practice DF steers, and indeed are required to stay current in the art.

• Endangered Species

I would like to know what you are doing about the 80 octane gas situation. If you are concerned you will find the answer to this potentially dangerous act by the oil companies.

Larry McDermott
Parsippany, N.J.

FAA Flight Standards Service has initiated a "Directed Safety Investigation" to be conducted throughout the country for the purpose of determining the impact of 80-octane fuel shortages on general aviation maintenance. The results of the study will be printed when they become available.

• VOR Check

As an instrument flight instructor I consider aviation related publications such as yours to be a tremendous asset to pilots. However, I think you should spend a moment "checking your article" on "checking your VOR" (March 1976). Perhaps I misunderstood, but I think you are wrong in your reference to AIM regarding the location of airborne and ground VOR checkpoints and in your reference to the FARs on the order of priority in methods to test a VOR. Also some of the tolerances for omni bearing selector error were not listed at all. Please comment.

Thomas F. Browne
St. Albans, N.Y.

Part 3 of AIM does contain a chapter on "VOR Receiver Check Points." In the current issue there are 20 pages—106 through 125—alphabetized by states (and by cities within each state). Locations are coded "A" or "G" (for Airborne or Ground) and the listings include the direction and distance from the facility to be used. Locations (and frequencies) of VOTs (omni test signals) are not included in that chapter, but are shown earlier in AIM Part 3 in the Airport/Facility directory under individual airport listings. For example, under Savannah (Ga.) the last line reads "Remarks: VOT, 111.0."

Allowable errors (before instrument flight can be made) are as follows: Ground checks using either VOT or a VOR signal, four degrees; dual VOR receivers compared one against the other, also four degrees; airborne checks using either a published checkpoint (from AIM Part 3) or one you devise yourself, six degrees.

• More on VOR Checks

The article in "Checking Your VOR" in the March issue omits one step in the record keeping as per regulation. You state, "the result of the VOR check (including date, place, degree of error, and signature of person making the check) must be entered in some permanent record." The regulation requires VOR equipment to be checked within ten days and ten hours of flight time before a flight may be made into IFR conditions. Therefore, the flight time must also be noted in the permanent record each time a VOR check is made.

Jeanne H. Bedinger
Sioux City, Iowa

Correct. The time log is essential to performing the required checks. To be precise, the regulation involved (FAR 91.25) is concerned with operating an aircraft under instrument flight rules, *which is not necessarily the same as a flight into IFR conditions.*

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFS-807, Washington, D.C. 20591.

• Cover Photos

As a pilot and photographer I have wondered how and where you obtained your cover pictures. If you obtain them from people like myself, I would like information on this.

Ron Kellum
Dyersburg, Tenn.

Most of our cover and other photos are produced by agency or professional photographers. We do occasionally buy unsolicited photos, if these are especially helpful in illustrating a point about aviation safety. If you have something you would like to submit, send a black and white print to: Editor, FAA GENERAL AVIATION NEWS, AFS-807, FAA, Washington, D.C. 20591.

• Room to Spare

Behind the back seat of my four-place *Cherokee* there is a roomy baggage area. The space is completely open to the cabin and has windows and safety belts (installed to restrain the luggage). When the seats are filled, can I let two small children (ages five and six) sit back there during a flight, perhaps on cushions, if their weight does not exceed the placarded limit of 200 pounds and the weight and balance checks okay?

Concerned Uncle
Columbus, Ohio

You may not.

FAR 91.14 requires that, during takeoff and landing, "each person on board must occupy a seat or berth with a safety belt properly secured about him." (Exceptions are children under age two, being held by an adult; or persons on board for the purpose of sport parachuting, who may sit on the floor, but must use safety belts.)

INSTRUMENT CORNER

• Unpublished Routes

As a new pilot I learn a lot from listening to other, more experienced pilots "hangar flying," at the airport coffee shop. But recent discussion of "unpublished routes" completely lost me. Can you explain this term?

Constance Lynn
Creve Coeur, Mo.

It may help to know that in air traffic language the word "published" means that it is shown on aeronautical charts or in other aeronautical publications and is thus approved for use in the National Airspace System. An "unpublished route" is a route used in flying under instrument flight rules, but for which no minimum altitude is published or charted for pilots. Examples would include a direct route between NAVAIDS, a radial, a radar vector, or a final approach course beyond the segments of the instrument approach procedure.

A "published route" on the other hand, is one for which an IFR altitude has been established and published on instrument en route or approach charts. Published routes include Federal airways, jet routes area navigation routes and specified direct routes.

U.S. GOVERNMENT PRINTING OFFICE
DIVISION OF PUBLIC DOCUMENTS
WASHINGTON, D.C. 20402

OFFICIAL BUSINESS

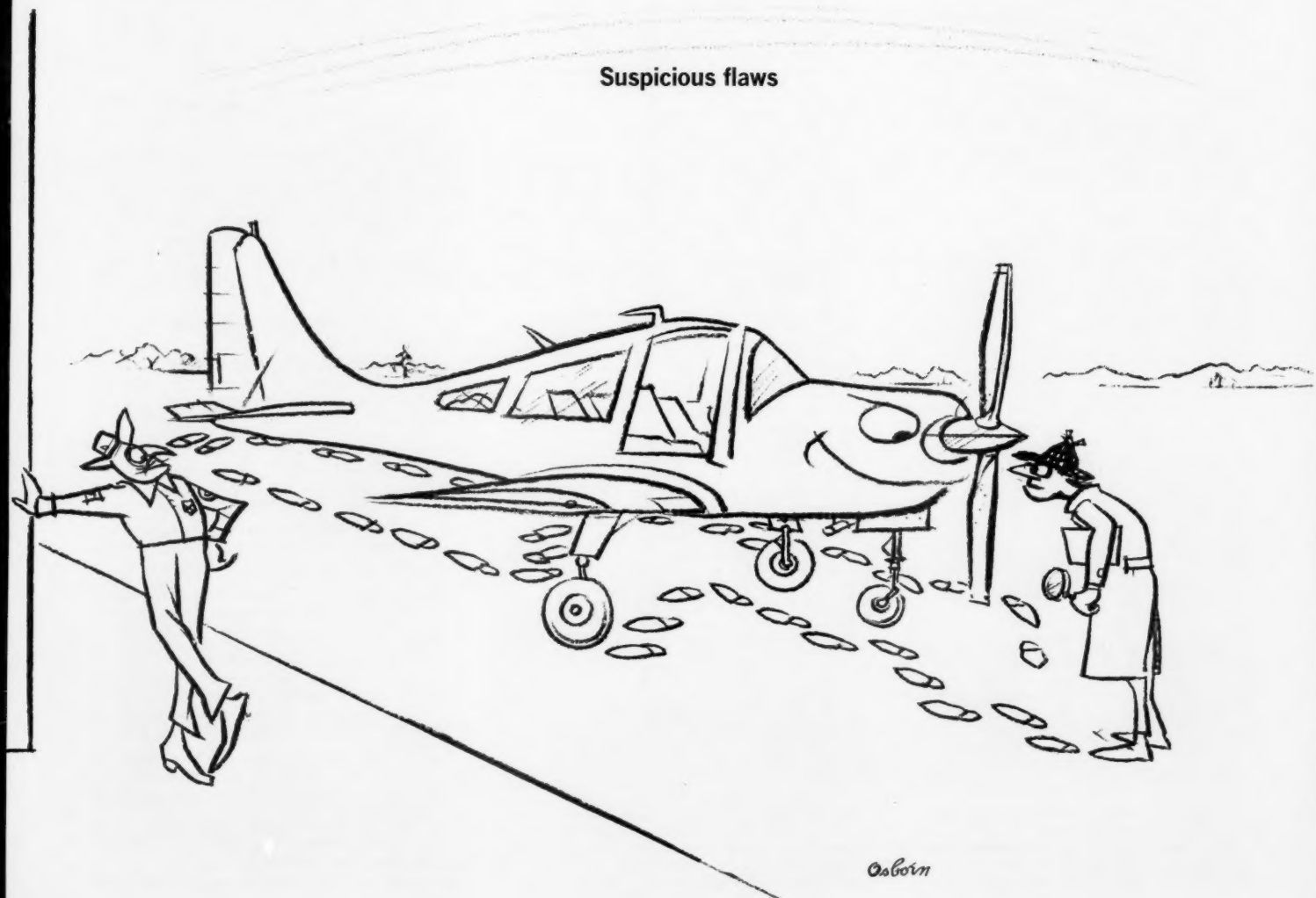
RETURN AFTER 5 DAYS

Postage and Fees Paid
Federal Aviation Administration
Third class
DOT 515

U.S. MAIL

FAN SERIA300SAISSOUE007R 1
SERIALS DEPT
XEROX UNIV MICROFILMS
300 N ZEEB RD
ANN ARBOR MI 48106

Suspicious flaws



Should make you pause

Idea suggested by Thom Hook,
FAA Headquarters, Washington, D.C.